Interconnection Process & Requirements

Under 2 MW Interconnection and Net Metering for Renewable Energy

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Changes to process with A37

- As of 6/1/2005 Colorado had 142 of interconnections. 82% solar, 15% mixed, 3% remaining others. Rate of installation and information requests has quadrupled since 1/1/06.
- Formalized process – Defined steps, tracked timeframes.
- No technical requirement changes – transparent.
- XCEL Energy Standard for Electric Installation and Use (Bluebook) upcoming additions to include parameters on interconnection requirements.
- Old interconnections are grandfathered in – No changes.

Generator / Inverter Approval

Pre-Certified Photovoltaic Inverters

- For small inverters (≤ 10 kW), the inverter and IEEE/UL standard protective function settings shall be considered acceptable, and will be considered satisfactory to meet the photovoltaic protective relaying equipment interconnection requirements of Xcel Energy in all jurisdictions.
- All other aspects of the applicable Interconnection Guideline book, such as disconnect switch and startup demonstration, must still be met.
- **IEEE Standard 929-2000**, IEEE Recommended Practice for Utility Interface of Photovoltaic (PV) Systems, establishes the requirements for pre-certification of photovoltaic inverters for connection to distribution feeders.
- **UL Standard 1741**, UL Standard for Inverters, Converters, and Controllers for Use in Independent Power Systems, establishes the testing protocol and materials for the pre-certification of PV inverters that are submitted for pre-certification.

Generator / Inverter Approval (Con't.)

Inverters that do not meet pre-certification requirements.

- System dynamics must be provided to Xcel Energy which covers: Total Harmonic Distortion (current and voltage distortion limits), Power Factor, Relay settings (frequency, voltage, over-current trip coordination, etc…)
- Refer to Xcel Energy's - Interconnection Guidelines for Small Power Producers, Customer Owned Generators and Non – Utility Generators.

Documentation

- A One-Line Diagram shall be provided to Xcel Energy preferably before installation. It shall include:
  - Site Address
  - Owner name
  - Inverter model, size, quantity, and electrical location
  - AC Disconnect electrical location
  - Utility meter electrical location
- A copy of the owner's General Liability Insurance Statement shall be provided to Xcel Energy.
  - Statement shall be for no less than $300,000 of general liability insurance for the facility/premises.
  - Commercial installations must have Xcel Energy named as insured on policy.

Metering

- A meter which is not detented shall be placed at the point of service once all other requirements are met.
  - Signed Interconnection Agreement
  - Provided One Line Diagram
  - Provided Insurance Statement
  - Area Engineer Review / Inspection / Approval

- NET meters are identified by a sticker on both the meter and meter housing.
- Operation of the system with a detented meter before a NET meter is installed can create an ambiguous energy usage reading if the facility generates more than the site consumes.
- Systems above 10kW will require both a NET meter plus a detented meter to measure production.

Signage

Sign identifying disconnect switch, example above

Signage on the meter and on the meter housing using same “black lettering on yellow background” convention made from plastic laminate. Xcel Energy will place signage when the net meter is installed.

It must be located on the disconnect cover, or if impractical, immediately adjacent to the PV disconnect switch, clearly visible to the naked eye. It must be mounted with permanent adhesive designed for outdoor use to ensure adhesion over time through extreme weather conditions.

Visible/ Lockable AC Disconnect

- All PV installations will be wired into a suitable load center with a visible, lockable disconnect switch which must be readily accessible to Xcel Energy personnel.
- This switch is to be located at the utility meter unless another readily accessible and easily identifiable location is found.
- Any alternate locations need to be approved by Xcel Energy.
- Electrical inspector will certify disconnect switch

Area Engineer Inspections

- The previous slides list the technical requirements that the engineers will be reviewing or inspecting at the site.
- Engineers will need to see a demonstration of a working system before approval to interconnect the system and to set a NET meter.
- Xcel Energy reserves the right to inspect any PV installation.

Questions & Answers